2001-04 STARTING & CHARGING SYSTEMS

Starters - 163 Chassis

MODEL IDENTIFICATION

WARNING: **Vehicles are equipped with air bag supplemental restraint system. Before attempting any repairs involving steering column, instrument panel or related components, see SERVICE PRECAUTIONS (or AIR BAG SAFETY PRECAUTIONS) and DISABLING & ACTIVATING AIR BAG SYSTEM in appropriate AIR BAG RESTRAINT SYSTEMS article.**

NOTE: When the battery is disconnected, vehicle computer and memory system may lose data. Driveability problems may exist until computer systems have completed a relearn cycle. Radio will not operate until coded. Obtain code card from customer.

NOTE: The following table identifies models applicable to this article.

MODEL IDENTIFICATION

Model	Chassis	Engine Number
ML430 (2001)	163.172	113.942
ML320 (2001-03)	163.154	112.942
ML55 AMG (2001-03)	163.174	113.981
ML500 (2002-04)	163.175	113.965
ML350 (2003-04)	163.157	112.970

DESCRIPTION

Starter is a brush-type, series-wound electric motor with an overrunning clutch. Field frame contains field coils and is enclosed by commutator/drive bushing end frame, which carries pole shoes. A splined armature shaft carries drive assembly.

TROUBLE SHOOTING

BASIC TROUBLESHOOTING

If starter is noisy, the cause could be bent or damaged gear tooth chamfers on ring gear. This cannot be seen with starter installed in vehicle. Activate starter without switching ignition on. Metallic noise should not be heard. If noise is heard, replace ring gear.

PRELIMINARY INSPECTION

Verify customer complaint by operating system. Visually inspect for obvious signs of mechanical and electrical damage. Check generator belt tension and condition. Ensure that battery voltage is within specifications. Inspect for blown fuses and damaged relays. For fuse and/or relay identification, see **WIRING DIAGRAMS**

Verify ground connection integrity between engine, body, battery and generator. Check for damaged wiring harnesses and/or switches. Check for a broken or partially broken wire inside insulation, which could cause system malfunction but prove good in a continuity/voltage check with system disconnected. Ensure any aftermarket electronic equipment is properly installed. If fault is found, repair as necessary. If no fault is found, check for conditions that might cause an intermittent situation.

SERVICE PRECAUTIONS

BATTERY DISCONNECT/CONNECT

Disconnect/Connect Procedures

NOTE: Numbers and letters in text refer to numbers and letters in figures.

1. Turn ignition off. Open engine hood. After opening vehicle wait at least 4 minutes before disconnecting battery or alarm will be triggered.
2. Disconnect negative battery cable (1) and insulate cable lug to prevent unwanted contact with ground point (W16/4). See **Fig. 1** .
3. To connect, reverse disconnect procedure. Tighten nut (5) to specification. See **TORQUE SPECIFICATIONS** .
4. Perform basic programming, read Diagnostic Trouble Code (DTC) memory and erase DTCs from memory. See **BASIC PROGRAMMING** and **RETRIEVING & ERASING DIAGNOSTIC TROUBLE CODES** .

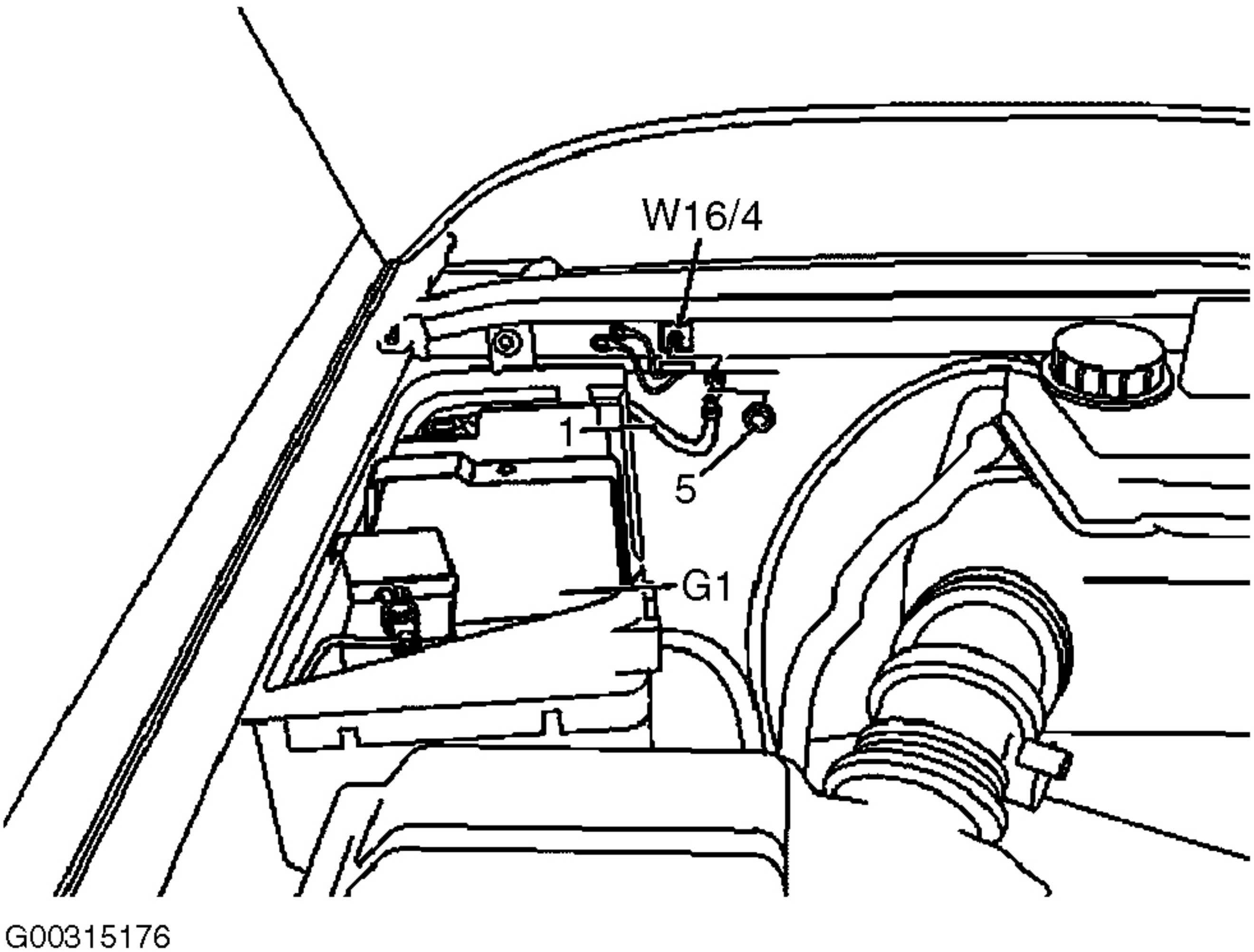


Fig. 1: Disconnecting Negative Battery Cable
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

BASIC PROGRAMMING

1. Code radio. See **Coding radio** .
2. Set time on instrument cluster. Pull out knob at lower right of speedometer. To adjust hour, turn to right. To adjust minute, turn to left.
3. If necessary, set time at stationary heater timer. See owner's manual.
4. Start engine and run at idle. Turn steering wheel from one lock position to the other to activate steering angle sensor. Center steering wheel. Malfunction indicator lamp should go out.
5. If equipped, normalize tilting/sliding roof. Open sunroof and hold down switch. Sunroof moves to end position and pulls back 1/4 turn and stops. If equipped with lemella sliding roof, close roof and keep

switch pressed for 5 to 10 seconds.

6. Normalize power windows. Completely close each window with manual switch. Hold switch in closed position for 5 seconds.

Coding radio

Hi-Line Premium With Bose(R)

1. Turn ignition on. CODE will appear on radio display. Enter first code number with station button. For example, station button 1 is number 1.
2. After entering first number, CODE will disappear and first number entered will appear followed by 4 dashes. The next character to be entered flashes. Repeat procedure until all numbers are entered.
3. If an input error has occurred it can be corrected at this time by reentering the complete correct code.
4. Confirm entry of correct code with < or > button.
5. If an incorrect code number has been entered, CODE appears again on display. If an incorrect code is entered 3 times, WAIT appears on display and radio locks up for approximately 10 minutes. If an incorrect code is entered 3 times again, lock time increases to 60 minutes. Radio must remain switched on during lock up time.

MB

1. Turn ignition on. CODE will appear on radio display. Enter first code number with station button. For example, station button 1 is number 1.
2. After entering first number, CODE will disappear and first number entered will appear followed by 4 dashes. The next character to be entered flashes.
3. After entering all 5 numbers the first character starts flashing again. If an input error has occurred it can be corrected at this time by reentering the complete correct code.
4. Press TUNE, AUTO/SEEK or SC button. If code is correct, radio automatically switches on and indicates the station or frequency stored with station button 1. If an incorrect code number has been entered, CODE appears again on display. If an incorrect code is entered 3 times, WAIT appears on display and radio locks up for approximately 10 minutes. If an incorrect code is entered 3 times again, radio locks up for approximately 10 additional minutes. After 9 incorrect attempts, lock time increases to 60 minutes. Another 3 incorrect entries locks up radio for another 60 minutes. Radio must remain switched on during lock up time.

RETRIEVING & ERASING DIAGNOSTIC TROUBLE CODES

NOTE:	Before replacing any component that scan tool suggests are faulty, ensure that all wiring connections and harness connectors are okay. Ensure that power and ground circuits are functioning properly. For circuit identification, see appropriate WIRING DIAGRAM under ENGINE PERFORMANCE in SYSTEM WIRING DIAGRAMS for vehicle being tested.

RETRIEVING DIAGNOSTIC TROUBLE CODES

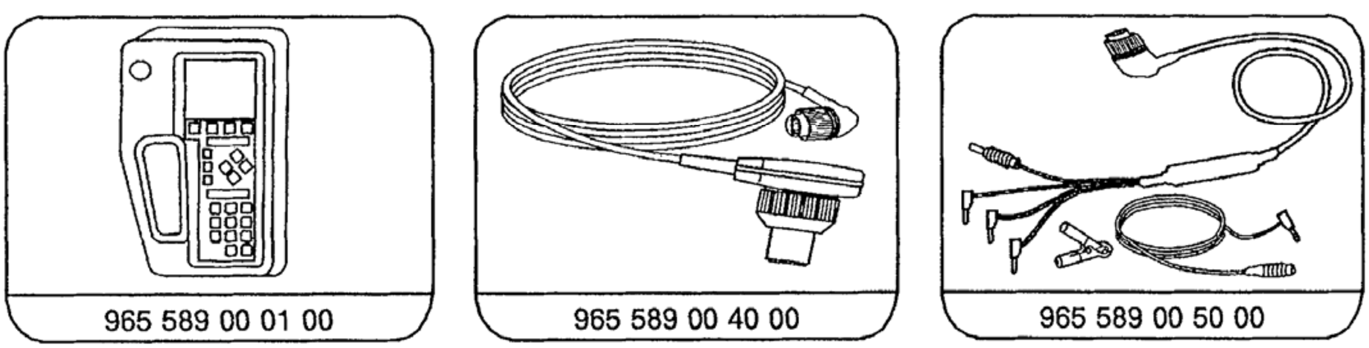
NOTE: For diagnostic equipment connections, see FAULT CODE DIAGNOSIS EQUIPMENT CONNECTION .

To retrieve codes using hand held tester, see **Fig. 2** .

Diagnostic trouble codes (DTC's) which have been stored due to testing or the disconnection of lines must be erased from the diagnostic trouble code memory at the end of testing.

- **Connect Hand-Held Tester (HHT) according to connection diagram.**
  The following functions can be performed according to the instructions on the display:
  a) Reading/erasing DTC memory
  b) Reading actual values
  c) Performing activations
  d) Programming control modules

Special Tools



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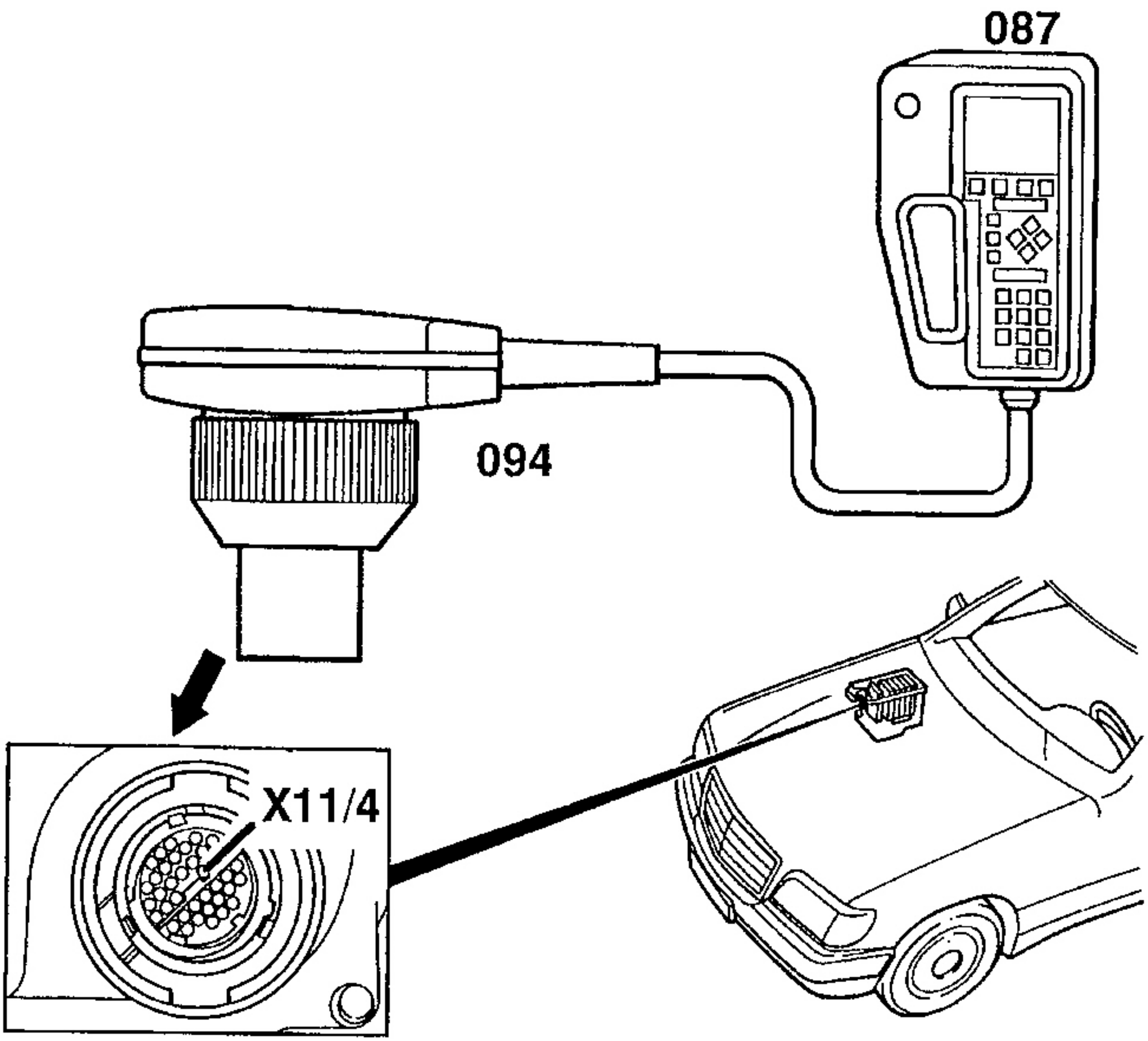
Fig. 2: Retrieving Codes Using Hand Held Tester
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

CLEARING DIAGNOSTIC TROUBLE CODES

Disconnecting vehicle battery will not erase codes. Follow scan tool equipment manufacturers instructions to erase fault codes.

FAULT CODE DIAGNOSIS EQUIPMENT CONNECTION

To connect hand held tester scan tool to Mercedes-Benz data link connector, see **Fig. 3** . To connect hand held tester scan tool to OBD-II data link connector, see **Fig. 4** .

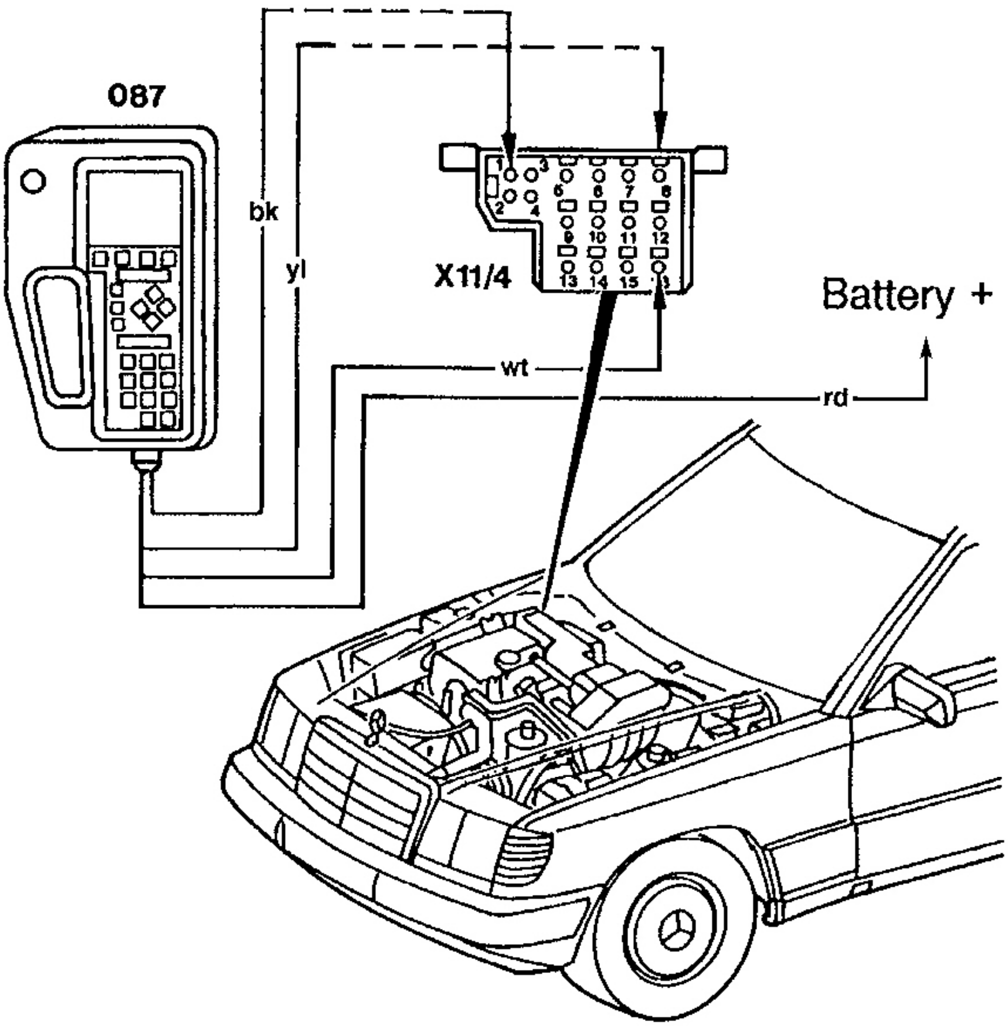


38-pole Data Link Connector (X11/4)

087 Hand–Held Tester (HHT)
094 Multiplexer, 965 589 00 40
X11/4 Data link connector

G00284764

Fig. 3: Connecting Hand Held Tester Scan Tool To Mercedes-Benz Data Link Connector
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.



16-pole Data Link Connector (X11/4)

Connect HHT as follows:

Black wire (circuit 31, ground):	socket 1
White wire (circuit 15, voltage):	socket 16
Red wire (circuit 30):	Battery +

Yellow wire to diagnostic output socket of the system being tested.

087	Hand-Held Tester (HHT)
X4/10	Terminal block, circuit 30
X11/4	Data link connector

Fig. 4: Connecting Hand Held Tester Scan Tool To OBD-II Data Link Connector
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

TESTING

Starter malfunctions may cause a Diagnostic Trouble Codes (DTCs) to be stored in Motor Electronics Sequential Fuel Injection (ME-SFI) system. After repairs are completed check for and erase any DTCs stored in (ME-SFI) system. See appropriate SELF-DIAGNOSTICS article in ENGINE PERFORMANCE. If cause of starter malfunction is not engine performance related, replace starter.

REMOVAL & INSTALLATION

STARTER

NOTE: Numbers and letters in text refer to numbers and letters in figures.

Removal & Installation

1. Disconnect and shield negative battery cable. See **BATTERY DISCONNECT/CONNECT** under SERVICE PRECAUTIONS.
2. Remove nut (2) for inner fender. See **Fig. 5** . Pull front and rear section of inner fender (1) downward. Move inner fender away inward and downward. Pull toward outside over wheel. DO NOT damage fender cutout or paint.
3. On vehicles with 112 engine, remove nut (6) at shield (5) of left engine mount and take out shield. See **Fig. 6** .
4. On all vehicles, disconnect circuit 30 (1) and circuit 50 (2) cables from starter. See **Fig. 6** . Remove bolts (3) for starter-to-crankcase. Take starter (M1) out to the side.
5. If replacing starter on vehicles with manual transmission, check ring gear at flywheel for wear and damage. If replacing starter on vehicles with automatic transmission, check ring gear on drive plate for wear and damage. Repair or replace damaged parts as necessary.
6. To install, reverse removal procedure. Replace bolts with locking splines, micro-encapsulated bolts and self-locking nuts. Mating thread of micro-encapsulated bolts must be cleaned to remove all residue of old bolt locking compound. Tighten fasteners to specification. See **TORQUE SPECIFICATIONS** . Connect battery. See **BATTERY DISCONNECT/CONNECT** under SERVICE PRECAUTIONS.

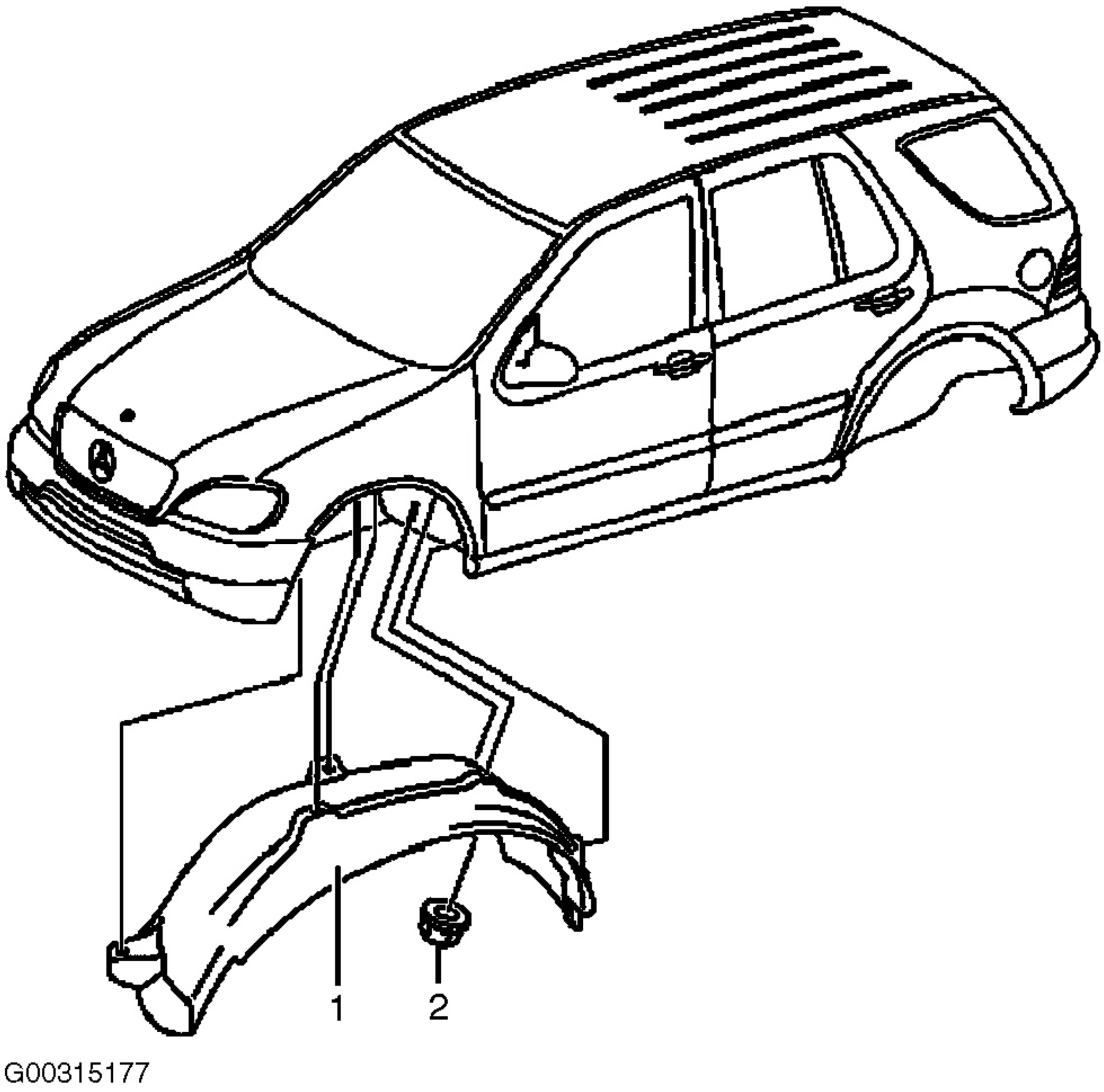


Fig. 5: Removing Inner Fender
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

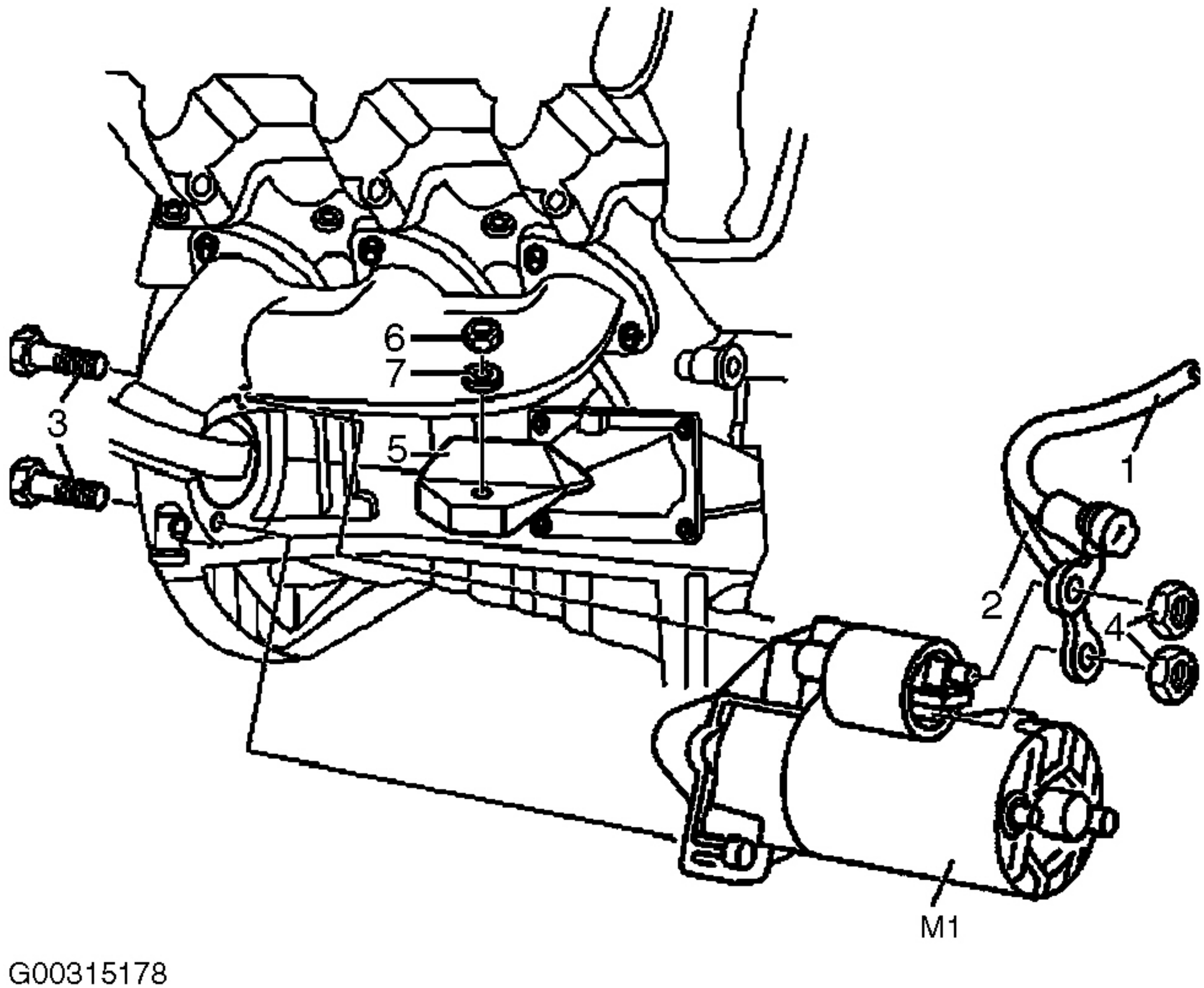


Fig. 6: Removing Starter
Courtesy of MERCEDES-BENZ OF NORTH AMERICA.

OVERHAUL

NOTE: Manufacturer does not recommend overhaul of starter.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)

Engine Mount-To-Engine Carrier	48 (65)
Ground Cable-To-Body	13 (18)
Starter-To-Crankcase	31 (42)
	INCH Lbs. (N.m)
Circuit 30 Connection Nut	124 (14)
Circuit 50 Connection Nut	53 (6)

WIRING DIAGRAMS

See STARTING SYSTEM wiring diagram in appropriate SYSTEM WIRING DIAGRAMS article in ELECTRICAL.